UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
901 NORTH 5TH STREET
KANSAS CITY, KANSAS 66101

SEP 07 2006

MEMORANDUM

SUBJECT: Draft Risk Assessment
Boeing Tract 1
St. Louis, Missouri

FROM: Jeremy Johnson
Toxicologist
ENSV/EAMB

TO: Stephanie Doolan
Project Manager
ARTD/RCAP

Per your request, we have reviewed the Draft Risk Assessment for Boeing Tract 1, dated July 7, 2006, prepared by Tetra Tech EM Inc. (Tetra Tech) on behalf of USEPA Region 7. Although we have already shared our comments on the document to you and Tetra Tech, we are submitting them to you in final form for the record.

General Comments

1. Tetra Tech should remove language from the risk assessment that compares USEPA risk assessment guidance to Missouri Risk-Based Corrective Action Guidance (MRBCA). It is our opinion that direct comparison of these two approaches is beyond the scope of the risk assessment. See Specific Comments 1, 3, 4, and 12.

2. Reference concentrations (RfCs) for several chemicals of potential concern (i.e., *cis*-1,2-dichloroethene, fluoranthene, n-propyl benzene, pyrene, sec-butylbenzene, tert-butylbenzene, and trans-1,2-dichloroethene) are derived from route-to-route extrapolation. Unless specific guidance is provided by USEPA or within a chemical's toxicity assessment to justify route-to-route extrapolation, route-to-route extrapolation is not recommended when characterizing human health risks. Uncertainties regarding lack of toxicity values should be discussed in the uncertainties section.

3. Tetra Tech should ensure that the toxicity assessment discussion on carcinogenic chemicals of potential concern is consistent with USEPA's 2005 Guidelines for Carcinogen Risk Assessment (USEPA, 2005).

4. When evaluating health risks and hazards resulting from exposure to trichloroethylene, the risk assessment should use the reference dose (RfD), RfC, and range of cancer slope factors provided in the August 2001 *Trichloroethylene Health Risk Assessment: Synthesis and Characterization, External Review Draft* (USEPA, 2001).

5. The risk assessment mistakenly estimates cancer risks from exposures to lead in soil. If lead has been identified as a constituent of potential concern (i.e., above screening levels) it should be evaluated using the Adult Lead Methodology. It is also not necessary to provide the California Environmental Protection Agency's oral cancer slope factor and inhalation unit risk in Tables A-6.1 and A-6.2.

6. The risk assessment does not use sub-chronic RfDs or RfCs to characterize non-carcinogenic health hazards for the construction worker scenario. When evaluating short-term exposures, such as construction work, the risk assessment should use sub-chronic toxicity data when available (see General Comment 7).

7. One of the most significant sources of uncertainty in this risk assessment is the use of chronic toxicity data to evaluate the construction worker exposure scenario; however, no discussion on this issue is provided in the uncertainties analysis. Region 7 recommends briefly discussing the uncertainties with using chronic toxicity data to evaluate sub-chronic exposures.

Specific Comments

1. **Section 1.0, Page 1, Paragraph 1.** The fourth sentence, which states "Although many of the procedures outlined in the MDNR's MRBCA guidance are similar to EPA's guidance, there are significant differences," should be removed from the risk assessment.

2. **Section 1.0, Page 1, Paragraph 1.** The fifth sentence starting with "Because of these differences..." should be reworded to state "For this reason, EPA tasked Tetra Tech to evaluate the risks at the facility following EPA risk assessment guidance (EPA 1989, 1991a, 1991b, 1997a, 2002a, 2003a, 2003b, and 2004a)."

3. **Section 3.3.3, Page 9, Paragraph 1**. The last sentence regarding a comparison of the exposure assumptions should be removed from the risk assessment.

4. **Table 1, Pages 10 – 14.** This table, which compares the exposure factors used in the 2004 risk assessment to the exposure factors used in the draft risk assessment, is unnecessary and should be removed from the risk assessment.

5. **Section 3.5.1, Page 20, Paragraph 2.** Per USEPA's *Supplemental Soil Screening Guidance for Developing Soil Screening Levels* (SSL guidance) (2002), an exposure frequency of 225 days/year should be used for the outdoor worker.

6. **Section 3.5.2, Page 21, Paragraph 3.** The risk assessment should use a default inhalation rate of 20 m^3/day for indoor and outdoor workers per USEPA guidance (1991 and 2002).

7. **Section 3.5.2, Page 22, Paragraph 2.** Tetra Tech should provide a brief discussion on how a surface area of 1,225 cm^2 was derived for a construction worker who contacts groundwater during trenching activities. This discussion should include body parts that will come into direct contact with groundwater.

8. **Table 6, Page 23.** This table references the Region 9 Preliminary Remediation Goals (PRGs) as a source for many of the fate and transport values. The original source of many of these values is the SSL guidance. This table should be revised to correctly cite the source of the fate and transport values.

   Additionally, this table should only provide the site-specific and default fate and transport values that are used in the risk assessment.

9. **Section 4.1, Page 27, Paragraph 1.** Although the cancer risk estimate is generally an upper-bound estimate, we do not recommend qualifying "excess lifetime cancer risk" with "upper-bound" (See Specific Comment 10). We also recommend revising the third and fourth sentences to state, "A SF is often an upper-bound estimate of the probability of a carcinogenic response per unit dose of a chemical over a lifetime. Slope factors (SFs) are derived through use of mathematical models based on a high-to-low dose extrapolation and generally under the assumption that no threshold exists for initiation of cancer."

10. **Section 5.1.1, Page 31, Paragraph 1.** We recommend removing the descriptor "upper-bound" from equation 5.1.

11. **Section 5.1.1, Page 32, Paragraph 1.** The last sentence inaccurately states "The EPA assistant administrator clarified EPA's interpretation of the risk range, saying that remedial action is generally not warranted below 1E-04 unless there is a high probability of ecological effects (EPA 1991b)." Per OSWER Directive 9355.0-30, other reasons for taking action when cumulative site risks are less than 1E-04 may include violation of chemical specific standards (i.e., ARARs) that define acceptable risks, noncarcinogenic effects, and uncertainties in the risk assessment results (1991b). Tetra Tech should revise this passage accordingly and properly cite OSWER Directive 9355.0-30.

12. **Section 6.0, Page 43.** This section should summarize the findings of the risk assessment. The discussion on the differences between the two risk assessments is not necessary.

13. **Table A-5.1 and A-5.2.** These tables should reference the original source for surrogate toxicity values for total petroleum hydrocarbon fractions. For example, Table A-5.2 should note that the n-hexane RfC from USEPA's Integrated Risk Information System is used as the surrogate RfC for C5-C8 aliphatics.

14. **Table A-6.1 and A-6.2.** These tables provide a vinyl chloride oral cancer slope factor and inhalation unit risk of 1.5 $(mg/kg\text{-}day)^{-1}$ and 8.8 $(\mu g/m^3)^{-1}$, respectively. Please note that these values should only be used for continuous exposure from birth (USEPA, 2006). For continuous exposure during adulthood (i.e., non-residential worker scenarios) the risk assessment must use an oral cancer slope factor of 7.2E-01 (mg/kg-day)-1 and inhalation unit risk of 4.4E-06 $(\mu g/m^3)^{-1}$ (USEPA, 2006).

15. **Table A-A.2.** This table cites the Texas Commission on Environmental Quality (TCEQ) as a source for chemical and physical data on chemicals of potential concern. Although many of the values are identical, the risk assessment should use the chemical and physical data provided in the SSL guidance.

    In addition, the total petroleum hydrocarbon (TPH) fractions presented in this table do not overlap with TCEQ's TPH fractions provided in their state guidance. Region 7 recommends using Massachusetts Department of Environmental Protection's chemical and physical data for TPH fractions. This information is available at http://www.mass.gov/dep/cleanup/02-411.pdf.

References

U.S. EPA. 1991a. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Emergency and Remedial Response, Washington, D.C. OSWER Publication 9285.6-03.

U.S. EPA. 1991b. Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions. Office of Solid Waste and Emergency Response, Washington, D.C. OSWER Directive 9355.0-30.

U.S. EPA. 2001. *Trichloroethylene Health Risk Assessment: Synthesis and Characterization, External Review Draft.* Office of Research and Development, Washington, D.C. EPA/600/P-01/002A.

U.S. EPA. 2002. *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.* Office of Solid Waste and Emergency Response, Washington D.C. 9355.4-2.

U.S. EPA, 2005. *Guidelines for Carcinogen Risk Assessment.* Risk Assessment Forum, Washington D.C. EPA/630/P-03/001F.

U.S. EPA. 2006. Integrated Risk Information System (IRIS). Available online at http:www.epa.gov/iris. Office of Research and Development, National Center for Environmental Assessment, Washington, D.C.